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EMPLOYMENT IN MONTANA 1960:
ANALYSIS BY INDUSTRY AND OCCUPATION

Paul E. Polzin

BUREAU OF BUSINESS AND ECONOMIC RESEARCH missoula ● montana

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University of Montana
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INTRODUCTION

An inventory and classification of resources is a necessary step in the analysis of a region's economy and in assessing its growth potential. This paper is concerned with only one of the resources: productive human beings, essential to the economic development of our state. However, despite its limited breadth, this task is complicated because of the difficulty of creating precise and homogeneous divisions into which human beings, with their diversity of talents, may be classified.

One may classify labor according to (1) the type of product which it produces, or (2) distinguishing features of the labor services provided. The first approach corresponds to an enumeration of employment by industry and the second to a classification by occupation. This study uses both approaches in an attempt to describe and analyze the structure of employment in Montana.

The basic data used throughout this paper is taken from the 1960 Census of Population. Now, in 1970, this information is ten years old and certainly does not reflect developments over the last decade. Moreover, the classifications of the Census Bureau were devised for ease in handling

questionnaire data and often do not correspond to economically meaningful concepts. However, this data provides the only complete enumeration of the employed labor force in Montana. Other sources, which are more up to date or use better categories, are all seriously deficient in their coverage. Therefore, the reader is cautioned that the conclusions obtained in this report are derived from data a decade old, collected and tabulated for other purposes.

I

EMPLOYMENT IN MONTANA--BY INDUSTRY

The classification of employment by industry is a useful, but limited, analytical tool. Essentially, this classification provides a measure of what is produced weighted by the amount of labor input. On the basis of this information, the industries most important in terms of employment may be identified. Then, further analysis may be used to discover why those particular industries have located in Montana.

The major shortcoming of the industrial classification is the implicit assumption that all labor within an industry is homogeneous and distinct from that of another industry. In other words, this approach treats two persons employed in the same industry as equals even though there are obvious differences between them. For example, two workers may be classified as different, even though they are of the same age, skill, etc., simply because they work in different industries. Thus this methodology, because it ignores some of the very factors which are thought to be important, should not be used to analyze the decisions of individuals

as suppliers of labor, or of firms as demanders of labor. Either, it simply describes existing conditions in an orderly and logical manner.

Moreover, the census classification has some other serious shortcomings. The primary drawbacks as they affect the analysis of Montana industries are in the way government employees and wives and children on family farms are classified.[1] Government employees, at the federal, state, and local levels, were allocated to those industries which correspond to their particular employment. For example, forest rangers would be assigned to the agriculture, forestry, and fishery industry. This means the classification of "public administration" includes only those employed in uniquely governmental tasks. Nor does the Census Bureau classify wives and children on family farms as part of the labor force; thus, the importance of employment in this industry is probably significantly underestimated.

A. Employment Patterns and "Specialized Industries"

Column 1 of table 1 presents the relative employment distribution for the state as a whole. The entry for each industry represents its share of male, female, and total employment in the state. The striking fact is the dominance of agriculture, forestry, and fisheries.[2] Almost

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1. Also, because people were classified by their employment during the Census Week in April 1960, those seasonal industries not in operation at this time were underrepresented and, conversely, those operating were overrepresented.

2. A different census tabulation of industrial employment which is not strictly comparable to the one used in this report, gives the following breakdown:

Agriculture, forestry, and fisheries	37,630
Agriculture	36,013
Forestry and fisheries	1,617

Thus, for Montana, the agriculture, forestry, and fisheries industry may be taken to represent the farm sector. See U.S. Department of Commerce, Bureau of the Census, U.S. Census of Population: 1960, Detailed Characteristics, Montana, table 124 (Washington, D.C.: U.S. Government Printing Office, 1963).

one-fifth of the entire labor force is employed in this classification--more than twice the proportion employed in all of manufacturing. The importance of agriculture has been declining in recent decades but, still it comprises the economic backbone of many regions in Montana.[3]

Comparison of columns 1, 2, and 3, show that males and females have very different industry employment patterns. The males are concentrated in the agriculture, extractive, and manufacturing sectors while females tend to be employed in the commercial and service sector.[4]

The relative frequency distributions of table 1 identify the industries which employ the bulk of the state's labor force. However, these distributions, by themselves, tell us nothing about Montana's industrial structure relative to that of other regions. Three--rather arbitrary--regions were constructed for comparison: the states of Wyoming and Idaho, taken together, representing a region with similar geographic and demographic characteristics; and the sum of Wyoming, Idaho, Washington, and Oregon, which will be a proxy for general trends in this area of the continent; and the entire United States, as an average of all states, were chosen. For each region the relative distribution of employment by industry--equivalent to table 1--for the total and each sex were computed. Then the relative frequency of employment in each industry in Montana was divided by the corresponding entry for each of the three regions, the results are presented in table 2. The entry 1.030 in the first row and column of table 2 may be interpreted as stating that, compared to Wyoming/Idaho the proportion of the labor force employed in agriculture, forestry,

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3. Paul E. Polzin, Employment Trends in Montana: 19[illegible] 1968, Staff Study, Montana Economic Study (Missoula: Bureau of Business and Economic Research, University of Montana).

4. As was mentioned earlier, the census definitions probably results in an underestimation of female employment in agriculture.

TABLE 1

Relative Distribution of the Employed in Montana, by Industry and Sex

		Proportion of Total Employed	Proportion of Male Employed	Proportion of Female Employed
1.	TOTAL	*	*	*
2.	Agriculture, forestry, and fisheries	.1766	.2335	.0401
3.	Mining	.0293	.0399	.0039
4.	Construction	.0644	.0887	.0062
5.	Manufacturing	.1013	.1297	.0331
6.	Furniture, lumber, wood	.0294	.0406	.0026
7.	Primary ferrous industries	.0005	.0007	-----
8.	Primary nonferrous industries	.0206	.0287	.0010
9.	Fabricated metals	.0014	.0016	.0008
0.	Machinery except electrical	.0025	.0033	.0007
1.	Electrical machinery	.0006	.0008	.0002
2.	Motor vehicles and equipment	.0001	.0002	-----
3.	Aircraft and parts	.0001	.0001	-----
4.	Other transportation equipment	.0005	.0007	.0001
5.	Other durables	.0046	.0057	.0018
6.	Food and kindred products	.0186	.0206	.0128
7.	Textile mill products	-----	-----	-----
8.	Apparel and other textiles	.0003	.0002	.0007
9.	Printing and publishing	.0117	.0131	.0083
0.	Chemicals	.0019	.0024	.0006
1.	Rubber and misc. products	.0003	.0003	.0002
2.	Other nondurables	.0078	.0099	.0027
3.	Railroads and railway express	.0404	.0544	.0069
4.	Trucking service and warehousing	.0138	.0181	.0053
5.	Other transportation	.0062	.0075	.0030
6.	Communication	.0155	.0108	.0270
7.	Utilities and sanitary services	.0147	.0181	.0066
8.	Wholesale trade	.0322	.0382	.0180
9.	Food and dairy retailing	.0253	.0217	.0339
0.	General merchandise and variety	.0182	.0079	.0429
1.	Eating and drinking places	.0422	.0211	.0928
2.	Other retail trade	.0855	.0886	.0779
3.	Finance, ins., and real estate	.0347	.0267	.0538
4.	Business services	.0053	.0047	.0066
5.	Repair services	.0151	.0203	.0027
6.	Hotels and lodging places	.0155	.0081	.0332
7.	Other personal services	.0439	.0150	.1152
8.	Entertainment	.0080	.0064	.0117
9.	Medical and other health services	.0462	.0151	.1207
0.	Educational services, government	.0569	.0303	.1207
1.	Educational services, private	.0103	.0042	.0256
2.	Welfare, religion, nonprofit organ.	.0139	.0113	.0200
3.	Other prof. and related services	.0100	.0089	.0127
4.	Public administration	.0544	.0526	.0587
5.	Industry not reported	.0220	.0169	.0344

ource: U.S. Department of Commerce, Bureau of the Census, U.S. Census of Population: 960, Detailed Characteristics, Montana, Final Report PC CD-28D (Washington, D.C.: U.S. overnment Printing Office, 1962), table 125.

May not sum to one because of rounding.

TABLE 2

Coefficients of Specialization

	Total Employed			Male			Female		
	Montana Coefficients of Specialization with Respect to			Montana Coefficients of Specialization with Respect to			Montana Coefficients of Specialization with Respect to		
	Wyo./ Idaho (1)	Wyo./Idaho Ore./Wash. (2)	United States (3)	Wyo./ Idaho (4)	Wyo./Idaho Ore./Wash. (5)	United States (6)	Wyo./ Idaho (7)	Wyo./Idaho Ore./Wash. (8)	United States (9)
2. Agriculture, forestry, & fisheries	1.030	1.986	2.628	1.041	2.030	2.583	.990	1.273	2.036
3. Mining	.796	3.709	2.901	.831	3.660	2.790	.582	3.250	2.600
4. Construction	.847	.954	1.105	.859	.942	1.065	.705	.700	.861
5. Manufacturing	.380	.462	.374	.961	.480	.430	.499	.309	.159
6. Furniture, lumber, wood	.925	.425	1.782	.951	.424	1.857	.553	.245	.531
7. Primary ferrous ind.	1.250	.167	.035	1.409	.167	.035	----	----	----
8. Primary nonferrous ind.	7.347	4.039	4.838	7.757	4.100	4.705	3.000	1.250	.588
9. Fabricated metals	.341	.189	.070	.308	.163	.065	.555	.555	.076
10. Machinery, exc. elec.	.735	.316	.103	.735	.314	.106	.778	.312	.070
11. Electrical machinery	.261	.125	.026	.275	.157	.036	.250	.047	.008
12. Motor vehicles & equip.	.250	.050	.008	.333	.074	.017	----	----	----
13. Aircraft & parts	.010	.004	.010	.083	.003	.008	----	----	----
14. Other transportation equipment	.294	.052	.008	.318	.053	.100	.250	.048	.001
15. Other durables	.868	.561	.217	.905	.576	.248	.643	.301	.104
16. Food & kindred prod.	.560	.627	.651	.679	.696	.643	.332	.432	.634
17. Tobacco manf. prod.	----	----	----	----	----	----	.500	.032	.010
18. Apparel & other textiles	.750	.006	.017	1.000	.167	.030	.778	.001	.017
19. Printing & publishing	1.194	.860	.665	1.260	.868	.679	1.012	.815	.585
20. Chemicals	.224	.235	.143	.220	.238	.150	.251	.171	.078
21. Rubber & misc. products	3.000	.500	.051	3.333	.428	.046	----	.400	.041
22. Other nondurables	.821	.478	.373	.818	.488	.446	.871	.281	.117

Source: U.S. Department of Commerce, Bureau of the Census, Census of Population: 1960, Detailed Characteristics, Montana, Idaho, Wyoming, Oregon, and Washington. U.S. Summary, Final Report (Washington, D.C.: U.S. Government Printing Office, 1962), Table 125 from table 125 in the state volumes and table 209 in the U.S. Summary.

TABLE 2--Continued

	Wyo./ Idaho (1)	Wyo./Idaho Ore./Wash. (2)	United States (3)	Wyo./ Idaho (4)	Wyo./Idaho Ore./Wash. (5)	United States (6)	Wyo./ Idaho (7)	Wyo./Idaho Ore./Wash. (8)	United States (9)
23. Railroads and railway express	1.384	2.115	2.786	1.374	2.068	2.667	1.917	2.991	2.875
24. Trucking serv. & warehousing	.754	.908	.979	.804	.933	.938	.423	.559	1.031
25. Other transportation	.704	.378	.452	.728	.562	.423	.600	.428	.566
26. Communication	1.270	1.157	1.230	1.256	1.080	1.200	1.292	1.208	1.350
27. Util. & sanitary serv.	.826	.980	1.058	.815	.958	1.000	.971	1.047	1.204
28. Wholesale trade	.944	.782	.942	.974	.816	.943	.841	.623	.949
29. Food & dairy retailing	1.063	1.020	.969	1.074	.964	.841	1.030	1.126	1.270
30. General mdse. & variety	1.017	.746	.746	.940	.731	.605	1.036	.789	.840
31. Eating & drinking places	1.156	1.307	1.518	.716	1.361	1.241	1.051	1.341	1.956
32. Other retail trade	.999	1.129	1.227	.988	1.102	1.177	.993	1.188	1.378
33. Finance, ins. & real estate	1.112	.868	.834	1.117	.881	.795	1.092	.878	.926
34. Business services	.510	.546	.453	.439	.540	.431	.680	.552	.603
35. Repair services	.968	1.007	1.153	1.000	1.049	1.115	.675	.730	1.059
36. Hotels and lodging places	.871	1.250	1.703	.810	1.110	1.286	.897	1.402	2.258
[illegible]	.993	.971	.869	1.087	.932	.811	.948	1.056	.973
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.830	1.158	1.206	1.581
[illegible]	1.204	2.074	2.161	1.132	.923	.844	1.319	1.100	1.423
40. Education, government	1.120	1.109	1.432	1.098	.962	1.416	1.117	1.271	1.504
41. Education, private	1.030	.928	.789	1.050	.824	.575	1.036	1.033	.748
42. Welfare, religion, & nonprofit organ.	1.230	.972	1.053	1.202	1.009	1.056	1.242	.952	1.005
43. Other prof. & related serv.	1.124	.917	.862	1.141	.864	.748	1.085	1.024	1.154
44. Public administration	1.115	1.079	1.099	1.136	1.037	1.000	1.067	1.176	1.502
45. Industry not reported	.973	.824	.546	.923	.752	.464	1.026	.988	.711

and fishery in Montana (.1766) is 1.030 times larger than that in the comparison region. These ratios of relative employment will be called "coefficients of specialization."

The coefficients of specialization indicate how the distribution of employment in Montana differs from that of the comparison regions. A coefficient greater than one implies that Montana has a larger proportion of its labor force employed in that industry than does the comparison region--that, comparatively, Montana employment specializes in that industry. Conversely, if the coefficient is less than one, Montana does not specialize in that industry. A coefficient of one indicates that the industry has the same relative importance, insofar as employment is concerned, in both areas.

The concentration of Montana males in "heavy" industries and females in the service and commercial sectors was mentioned earlier. The normal specialization of labor between sexes would naturally lead to differences in the employment patterns. However, comparison of tables 1 and 2 shows that, for each sex taken separately, many of the industries which employ a large number of male or female Montanans also have coefficients of specialization greater than one. This means that the sexual differences in employment are greater than one would expect from the specialization of labor. Apparently, the industries which have located in Montana are those whose employment tends to be predominantly of one sex.

The structure of employment in Montana differs from that in areas thought to be quite similar, such as Wyoming/Idaho. Also, as would be expected, as the comparison region is expanded and it becomes less similar to Montana, we find that Montana employment becomes (relatively) more specialized. To measure the extent of this specialization the first columns of tables 3, 4, and 5 present the percent of Montana's employment

TABLE 3

Percent of Total Montana Employment in Specialized Industries

Comparison Region	All Specialized Industries	Export Industries	Domestic Industries
Wyoming/Idaho	41.09	8.82	32.27
Wyoming/Idaho/ Oregon/Washington	53.69	28.24	25.45
United States	65.23	31.18	34.05

TABLE 4

Percent of Male Montana Employment in Specialized Industries

Comparison Region	All Specialized Industries	Export Industries	Domestic Industries
Wyoming/Idaho	22.16	10.70	11.46
Wyoming/Idaho/ Oregon/Washington	46.62	35.65	10.97
United States	56.82	40.79	16.03

TABLE 5

Percent of Female Montana Employment in Specialized Industries

Comparison Region	All Specialized Industries	Export Industries	Domestic Industries
Wyoming/Idaho	30.01	2.70	27.31
Wyoming/Idaho/ Oregon/Washington	61.67	6.71	54.96
United States	62.94	6.71	56.23

Source: Derived from table 1.

in "specialized industries."[5] For the purpose of this calculation a "specialized industry" is defined as one which has a coefficient of specialization greater than 1.10 and employs more than 1 percent of the relevant, total, male, or female Montana labor force.[6] In other words, a specialized industry is one which employs a greater proportion of Montana's labor force than its equivalent in a comparison region. Also, it suggests that Montana produces more of this product than the comparison region.

The first column of table 3 shows that over 40 percent of Montana's employment is in "specialized industries" when Wyoming/Idaho is used as a comparison. This means that two people out of five in our labor force are employed in an industry whose relative importance in Montana is significantly greater than that of our adjacent neighbors. Thus the notion that Montana, Wyoming, and Idaho represent a relatively homogeneous industrial region must be held with some reservation. As tables 4 and 5 indicate, separation of the sexes reveals that the concentration of employment in specialized industries is greater for females than males.

The portion of Montana's employment in specialized industries rises to 54 percent when the comparison region is expanded to include Washington and Oregon. The primary reason is that in this comparison agriculture, forestry, and fisheries falls into the classification of a specialized industry. Tables 4 and 5 show that the concentration of specialized employment for males increases from 22 to 47 percent and for females it increases from 30 to 62 percent. Agriculture, forestry, and fisheries becomes a

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5. The exact classification of "specialized industries" is presented in table 6. Also, "export" and "domestic" categories will be discussed later.

6. 1.10 was chosen as the lower boundary to insure the inclusion of only those industries which exhibit a definite tendency toward specialization. The employment minimum was devised so as to eliminate those industries which are insignificant in both Montana and the comparison region, but more so in the latter. Total, male, and female employment in Montana was 235,000; 165,391; and 69,965. Thus, an industry must have had 2,313; 1,652; or 691 employees to be classified as "specialized."

specialized industry for both sexes, but its addition is more quantitatively important for males, perhaps reflecting an underreporting of female participation in this industry group. For females, the primary cause of the increase in specialized employment is the addition of commercial, service, and governmental industries. In toto, the increase for males reflects the addition of agriculture, forestry, and fisheries; mining; and several commercial classifications, and the deletion of communication, public administration, welfare, and other professional and related services from the list of specialized industries.

The highest degree of specialization for Montana's labor force is found when the entire United States is used as the comparison region. In this comparison, table 3 reports that 65 percent of Montana's labor force is employed in specialized industries. The concentration of male employment is approximately the same as that of females, about 60 percent.

Several generalizations concerning the extent to which Montana's employment is concentrated in specialized industries may be made. First, as one enlarges the comparison region, the Montana proportion employed in specialized industries increases. This reflects the fact that, as the diversity of the comparison region increases, the number of industries in which Montana may be specialized is expanded. Second, the fact that such a large portion of Montana's labor force is in specialized industries should cause no concern. The fact that an industry is specialized may go hand in hand with the fact that it is a major employer in the area. In many cases, for an industry to be relatively more important in Montana than in a comparison region, it must employ a relatively large amount of this state's labor force. Third, the data seem to indicate that, with a few exceptions which will be discussed later, an industry which is specialized with respect to one comparison region also tends to be specialized with

respect to the others. Thus, it is quite simple to identify those industries--and products--which are most important to Montana.

B. Montana's Economic Base

Montana's specialized industries may be classified into two broad categories, depending on the market in which their product is sold. Domestic industries are those whose product is consumed in the state. Those industries whose output is, for the most part, transported outside the state for sale or final consumption are called export industries. On the basis of these definitions, the specialized industries of table 2 are identified as Export (E) or Domestic (D) and are presented in table 6.[7]

The export industries are closely associated with what is often called the Economic Base of Montana. Essentially, this means that the demand for these goods, because they are sold in markets outside the state, are exogenous to this area's economic system and are a conduit by which outside influences affect local conditions. The vitality of the local economy is largely dependent on the size and growth of the export sector.

The second column of tables 3, 4, and 5 gives the percent of total, male, and female employment in specialized industries producing for export--Montana's economic base. Less than one-third of Montana's employment--when the United States is used as a comparison region--is in export industries. However, the breakdown by sex reveals that males constitute

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7. The decision as to which category an industry should be placed in was usually quite easy and, we hope, noncontroversial. Only two decisions require elaboration. The railway and communication industries were classified as export (even though most employees perform services which are usually unable to be exported) because they were considered to be producing products consumed for the most part, outside the state. It may also be argued that, to the extent that the lodging and hotel and eating and drinking industries are dependent on out-of-state tourism, or sale of services to nonresidents, they should be classified as export. This point is well taken, but reasons for our decision will be given in a later section of this paper.

TABLE 6

Montana Specialized Industries

	Total Employment			Male Employment			Female Employment		
	Wyo./ Idaho (1)	Wyo./Idaho Ore./Wash. (2)	United States (3)	Wyo./ Idaho (4)	Wyo./Idaho Ore./Wash. (5)	United States (6)	Wyo./ Idaho (7)	Wyo./Idaho Ore./Wash. (8)	United States (9)
Agriculture, forestry, & fisheries	---	(E)	(E)	---	(E)	(E)	---	(E)	(E)
Mining	---	(E)	(E)	---	(E)	(E)	---	---	---
Construction	(D)	---	(D)	---	---	---	---	---	---
Furniture, lumber, wood	---	---	(E)	(E)	(E)	(E)	---	---	---
Primary nonferrous ind.	(E)	(E)	(E)	---	---	---	---	---	---
Printing & publishing	(E)	---	---	(E)	---	---	---	---	---
Railroads & railway express	(E)	(E)	(E)	(E)	(E)	(E)	---	---	---
Communication	(E)	(E)	(E)	(E)	---	(E)	(E)	(E)	(E)
Food & dairy retailing	---	---	---	---	---	---	---	(D)	(D)
Eating & drinking places	(D)	(D)	(D)	---	(D)	(D)	---	(D)	(D)
Other retail trade	---	(D)	(D)	---	(D)	(D)	---	(D)	(D)
Finance, insurance, & real estate	(D)	---	---	(D)	---	---	---	---	---
Repair services	---	---	(D)	---	---	(D)	---	---	---
Hotels & lodging places	---	(D)	(D)	---	---	---	---	(D)	(D)
Entertainment	---	---	---	---	---	---	(D)	(D)	(D)
Medical & other health services	(D)	---	(D)	(D)	---	---	(D)	(D)	(D)
Educational services, government	(D)	(D)	(D)	---	---	(D)	(D)	(D)	(D)
Welfare, religion, nonprofit org.	(D)	---	---	(D)	---	---	(D)	---	---
Other prof. & related services	(D)	---	---	(D)	---	---	---	---	(D)
Public administration	(D)	---	---	(D)	---	---	---	(D)	(D)

Source: Derived from tables 1 and 2.

Note: (E) and (D) denote export and domestic specialized industries. The entries of this table may be interpreted as follows: for total employment, agriculture, forestry, and fisheries is a specialized industry producing for export when the United States and the sum of Wyoming, Idaho, Oregon, and Washington are used as comparison regions.

by far the bulk of Montana's employment in export categories. This suggests that, if the status quo continues, female employment would benefit little from the direct expansion of Montana's economic base. On the other hand, because Montana has so relatively few women employed in export industries, the state may benefit by the introduction of industries which rely heavily on female employment.

Examination of the industries comprising Montana's economic base--denoted with an (E) in table 6--leaves little doubt as to the reason why they have located here. All of the specialized export industries, with the exception of transportation and communication, are directly concerned with the exploitation of Montana's natural resources. It is natural that they should be located near the source, but the overall implication of this is that Montana has no substantial attraction for export industries except its natural resources and that attempts to encourage a diversified industrial base have failed.

Specialized industries classified as domestic present an interesting problem. The products of these industries are, for the most part, services which must be consumed within the state at the point of origin. Thus, if output is related to employment, Montanans must be consuming a larger quantity of the products of these industries than the comparison region.[8]

It has been suggested that the geographic and demographic characteristics of Montana, a large land area with a small population, may explain the specialization of industries producing for domestic consumption.

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8. It is, of course, possible that Montanans are simply less efficient; in other words, it would require larger employment to produce the same quantity of output. But this possibility is closely related to the problems of scale, to be discussed next.

Specifically, these demographic characteristics limit the size of the market for these services, which must be consumed at or near the point of origin. This implies that these Montana industries may be unable to take advantage of the economies of scale available to the same industry in a more populous state and therefore require proportionately more labor.[9] Another suggestion is that the size of Montana leads its residents to consume more of certain services than would a state with higher population density. For example, simply in order to transact normal business, much more long distance travel must be undertaken within the state. Thus, Montana's apparent specialization in tourism, as represented by the classifications titled eating and drinking places (No. 31) and hotels and lodging (No. 36), may not represent only the travel of out-of-state residents, essentially an export of services, but simply an unusual amount of travel by residents, often in connection with their work.

The geographic and demographic features of Idaho/Wyoming are similar to those of Montana. The coefficients of specialization in table 2 may be examined to see if common factors, such as low population density, have influenced the industries which have specialized for domestic production. Specifically, if a common factor has affected the service industries in these three states, Montana's coefficients of specialization with respect to Wyoming/Idaho should be lower than when the other regions

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9. This does not imply that Montanans are inherently less efficient, but simply that our firms produce on a higher portion of the average cost curve than do firms in other states. However, this explanation does seem applicable to certain governmental services, especially on the local level, where some minimum level of operation must be maintained, i.e., at least one sheriff per county, regardless of the size of the market. Unfortunately, the Census Bureau's classification of government employment prevents a direct test of this hypothesis.

are used as comparisons. In other words, these industries should be "less specialized" with respect to our adjacent neighbors than in comparison with the four-state region or the United States. Examination of the coefficients of specialization of industries producing for domestic consumption does not suggest a common cause is involved. In two industries, eating and drinking places (No. 31) and hotels and lodging (No. 36), Montana's coefficients of specialization with respect to Wyoming/Idaho are smaller than when the other regions are used as a comparison--indicating that Montana is less different from our adjacent states than the other regions. However, Montana more closely resembles the four-state region and the United States in the other four specialized domestic industries.[10] Thus, Montana's geographic and demographic features appear to explain only one-third of our industries specialized for domestic production.

C. Summary

The industrial distribution of employment allows the identification of the major employers in the state. Interstate comparisons of the employment distribution enables certain industries in Montana to be identified as specialized. Several hypotheses have been presented to explain the specialization of certain industries. Those industries producing for export are obviously located in this state in order to be near the source of raw materials and some of the domestic service industries may be specialized because of the physical characteristics of region. However, no absolute relationship between Montana's geography and the structure of industrial employment has been discovered.

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10. Other professional and related (No. 45), welfare, religious, and nonprofit organizations (No. 42), medical and other health services (No. 39), and finance, insurance, and real estate (No. 33).

II

EMPLOYMENT IN MONTANA: BY OCCUPATION

The previous discussion of industrial employment in Montana has described the uses to which the state's labor force is put. However, this examination did not reveal all that we want to know. This section is concerned with the employed labor force in Montana classified by occupation as opposed to the industrial classification discussed previously. Study of employment from this vantage point is useful because it may more closely represent the separate markets for different types of labor.

The individual, in determining what job he takes, is usually concerned not so much with the type of product which is produced as with the type of work he will do. Each individual possesses a set of characteristics which suit him relatively more for one type of occupation than for others. On the other hand, each firm, depending on its production function and level of output, has requirements for particular types of labor. The interaction of these two factors, the supply and demand for certain types of labor, determine levels of employment in each occupation. Therefore the occupational grouping of employment more accurately reflects the structure of decisions by suppliers and demanders of labor than does the classification of employment by industry.

A. The Structure of Occupational Employment

Table 7 presents the distribution of employment in Montana classified by occupation and industry in April 1960. Each row represents an industry,

Montana's Relative Distribution of Occupations, by Industry

	Proportion of Total Employment in Industry	Professional, Technical, & Kindred	Managers, Officials, & Proprietors		Clerical & Kindred	Sales Workers	Craftsmen	Operatives & Kindred	Service Workers	Laborers (Including Farm)	Occupation not Reported
			Salaried	Self-Employed							
1. TOTAL	1.0000*	.1121	.0585	.1508	.1170	.0655	.1228	.1162	.1248	.1023	.0296
2. Agriculture, forestry, fisheries	.1766	.0221	.0059	.6153	.0118	.0005	.0065	.0170	.0093	.3104	.0006
3. Mining	.0293	.0838	.0268	.0194	.0575	.0026	.2095	.5586	.0256	.0000	.0157
4. Construction	.0644	.0628	.0413	.0657	.0419	.0011	.5171	.1128	.0058	.1451	.0059
5. Manufacturing	.1013	.0500	.0513	.0229	.0779	.0685	.2208	.3346	.0169	.1437	.0129
6. Furniture, timber, wood	.0294	.0133	.0394	.0283	.0383	.0118	.1877	.3688	.0114	.2926	.0079
7. Primary ferrous industries	.0005	.0634	.0634	.0000	.0555	.0317	.3492	.2777	.0317	.0634	.0634
8. Primary nonferrous industries	.0206	.0417	.0207	.0000	.0432	.0010	.2663	.4256	.0224	.1615	.0172
9. Fabricated metals	.0014	.0457	.0731	.0365	.1463	.1615	.2195	.2225	.0152	.0670	.0121
10. Machinery, except electrical	.0025	.1120	.0543	.0797	.0747	.0882	.3870	.1697	.0067	.0203	.0067
11. Electrical machinery	.0006	.1946	.0805	.0268	.1610	.1879	.1879	.1342	.0000	.0000	.0268
12. Motor vehicles and equipment	.0001	.0000	.4444	.0000	.0000	.1777	.0888	.1777	.0888	.0000	.0000
13. Aircraft and parts	.0001	.1333	.0000	.0000	.0000	.2666	.1333	.3000	.1333	.0000	.0000
14. Other transportation equipment	.0005	.0000	.0000	.0601	.0902	.0375	.4511	.3007	.0000	.0300	.0300
15. Other durables	.0046	.0634	.0513	.0345	.0578	.0298	.2474	.3669	.0037	.1381	.0065
16. Food and kindred products	.0183	.0146	.0886	.0334	.1110	.0676	.1741	.4157	.0355	.0443	.0148
17. Textile mill products	.0000	.0000	.0000	.0000	.0000	.1818	.6363	.1818	.0000	.0000	.0000
18. Apparel and other textiles	.0003	.0000	.0869	.0978	.0869	.2608	.0434	.4239	.0000	.0000	.0000
19. Printing and publishing	.0117	.1103	.0579	.0269	.1369	.3063	.2720	.0590	.0103	.0077	.0121
20. Chemicals	.0019	.0781	.0491	.0089	.1071	.1316	.0982	.3058	.0000	.1941	.0267
21. Rubber and misc. products	.0003	.0000	.1250	.0000	.1666	.4166	.0555	.1805	.0000	.0000	.0555
22. Other nondurables	.0078	.1644	.0625	.0044	.1406	.0531	.2170	.2751	.0049	.0636	.0139
23. Railroads and railway express	.0041	.0065	.0789	.0000	.1828	.0008	.3345	.2132	.0227	.1505	.0059
24. Trucking service and warehousing	.0138	.0050	.0620	.0591	.0830	.0100	.0748	.6214	.0025	.0526	.0075
25. Other transportation	.0062	.0605	.0508	.0222	.1461	.0027	.1377	.4892	.0473	.0271	.0166
26. Communication	.0155	.0940	.1028	.0085	.4775	.0246	.2545	.0066	.0202	.0022	.0085
27. Utilities and sanitary services	.0147	.0725	.1018	.0040	.1960	.0087	.3093	.1337	.0140	.1340	.0178
28. Wholesale trade	.0322	.0183	.1853	.0897	.1862	.1929	.0655	.1464	.0144	.0888	.0223
29. Food and dairy retailing	.0253	.0023	.0986	.1257	.1559	.3073	.0190	.1766	.0216	.0828	.0097
30. General merchandise variety	.0182	.0042	.1433	.0450	.1231	.5507	.0315	.0327	.0150	.0087	.0174
31. Eating and drinking places	.0422	.0115	.0247	.1005	.0148	.0092	.0040	.0024	.8110	.0057	.0143
32. Other retail trade	.0855	.0251	.1071	.1473	.1146	.2690	.1521	.1275	.0176	.0272	.0087
33. Finance, ins., and real estate	.0347	.0191	.1606	.0741	.4190	.2372	.0113	.0024	.0436	.0216	.0109
34. Business services	.0076	.0967	.0926	.0503	.5121	.1073	.1178	.0691	.1146	.0170	.0130
35. Repair services	.0151	.0000	.0299	.0818	.0521	.0228	.6623	.1000	.0042	.0376	.0088
36. Hotels and lodging places	.0155	.0044	.0841	.2117	.1042	.0025	.0348	.0225	.5082	.0122	.0150
37. Other personal service	.0439	.0335	.0101	.0271	.0209	.0040	.0199	.1438	.6967	.0603	.0067
38. Entertainment	.0108	.1075	.0718	.0923	.1264	.0410	.1031	.0719	.3743	.0671	.0086
39. Medical and other health services	.0402	.1395	.0111	.0083	.1266	.0003	.0212	.0276	.3481	.0055	.0119
40. Educational services, government	.0362	.2653	.0089	.0000	.0911	.0000	.0171	.0046	.1501	.0056	.0084
41. Educational services, private	.0103	.2548	.0104	.0016	.0678	.0037	.0153	.0009	.1286	.0000	.0041
42. Welfare, religious, nonprofit orgs.	.0179	.4190	.0782	.0044	.1618	.0040	.0133	.0276	.2183	.0148	.0106
43. Other pers. and related services	.0191	.2984	.0239	.0163	.5206	.0000	.0210	.0048	.0287	.0917	.0137
44. Public administration	.0541	.2466	.1611	.0000	.1061	.0020	.0000	.0000	.1000	.0076	.0109
45. Industry not reported	.0230	.1000	.0454	.0004	.1000	.0041	.0758	.0000	.0000	.0000	.0000

[illegible]

[illegible]

* [illegible]

whose definition is identical to that used in the first section. The first row presents the proportion of total employment in each occupation. Each column, except the first, describes the proportion of the employment in individual industries in each occupation. The first column is identical to column 4 of table 1 and gives the relative importance of each industry. For example, the entry in the second row, second column--.0221--shows that 2.21 percent of the employment in the agriculture, forestry, and fisheries industry is in the professional, technical, and kindred occupation group.

Comparison of the rows of table 7 discloses vast differences in the occupational structure of employment among Montana industries. For example, employment in construction (No. 4) is concentrated in the craftsmen and laborer categories, while managerial, clerical, and sales classifications dominate the food and dairy (No. 29) industry. Much of this difference may be attributed to the variety of outputs produced by Montana industries. The product of the construction industry is obviously different from that of food and dairy, and would require different types of labor to produce it. Or, in formal terms, one may say that the differences in industry production functions lead them to use different mixes of the various occupations. To the extent that Montanans in an occupation are able and willing to move in response to job openings, then the differences in the occupational mix between industries may be attributed to demand factors. That is, if each Montana industry faces the same labor supply function in each occupation, industry differences in occupational employment, reading down each column, would be caused by variations in the demand for the occupation.

Examination of the rows of table 7 reveals that the occupational mix does, in fact, differ between the various Montana industry--indicating that different products require different types of labor. In table 7, the

prevalence of family farming is mirrored by the fact that over 60 percent of the employment in agriculture, forestry, and fisheries (No. 2) is classified as self-employed managers, officials, and proprietors. On the other hand, employment in mining (No. 3), one of Montana's other major extractive industries, is concentrated in the craftsmen occupation. The sales and service character of the motor vehicle and equipment industry (No. 12) is demonstrated by the large proportion of its employment in the managerial, sales, and operative occupations.

The information contained in the occupational distribution of employment by industry in Montana is of some interest taken by itself, but does not reveal anything about the special characteristics of employment in the state. To reveal Montana's position relative to other regions, arrays equivalent to table 7 were computed for Wyoming/Idaho and for Wyoming/Idaho/Oregon/Washington and, finally, for the entire United States. To facilitate comparisons, each row and column element of the Montana industry and occupation classification was divided by the corresponding entry for each of the comparison regions. The results are presented in tables 8, 9, and 10. For example, the ratio 1.3726 in the first column, second row of table 8 was obtained by dividing .0221, the entry in the second row and column of table 7, by the corresponding number, .0161, for the Wyoming/Idaho region. This ratio indicates that the agriculture, forestry, and fisheries industry in Montana employs 1.37 times as many people in the professional, technical, and kindred occupation than the same industry in Wyoming/Idaho. Stated in a different way, tables 8, 9, and 10 simply represent a comparison of occupational distributions taking one industry at a time.

TABLE 8

Montana's Relative Distribution of Occupations, by Industry, Compared to Wyoming/Idaho

	Professional, Technical, & Kindred	Managers, Officials, & Proprietors		Clerical & Kindred	Sales Workers	Craftsmen	Operatives & Kindred	Service Workers	Laborers (Including Farm)	Occupation not Reported
		Salaried	Self-Employed							
1. TOTAL	1.0284	1.0034	1.0392	1.0694	1.0720	.9352	.8537	1.0985	.9525	1.0533
2. Agriculture, forestry, fisheries	1.3726	.6941	1.0409	1.4216	.6250	.6435	.7762	1.7884	.9218	.7500
3. Mining	.7174	.5903	1.3661	.6902	1.3684	.8725	1.1693	2.3925	.0000	1.6526
4. Construction	.9359	.9856	1.0154	.9952	.4583	1.0019	1.0000	.7250	1.0393	1.2553
5. Manufacturing	.6934	1.0363	.9870	.9987	1.2568	1.0687	.9192	1.1736	1.1560	.9847
6. Furniture, lumber, wood	.8807	1.0974	1.0143	.8080	1.6619	.9665	1.0612	.6826	.9858	.7181
7. Primary ferrous industries	.0000	.7611	.0000	.8880	.3514	1.1694	.8162	.0000	.7611	2.2888
8. Primary nonferrous industries	.9025	1.2937	.0000	.8588	.1250	1.0807	.8907	.9696	1.4871	.7782
9. Fabricated metals	.2262	1.7829	3.4112	.8326	4.7084	.7582	1.1433	.7524	6.6336	.5627
10. Machinery, except electrical	3.0026	.4809	1.3836	.7302	2.7911	1.1507	.6022	.6380	1.0913	.6380
11. Electrical machinery	.4137	1.4770	1.7070	1.0893	4.4316	1.2021	1.4201	.0000	.0000	5.5833
12. Motor vehicles and equipment	.0000	3.6426	.0000	.0000	2.0378	.3471	.5993	1.9096	.0000	.0000
13. Aircraft and parts	.5682	.0000	.0000	.0000	.0000	.3758	2.2388	3.4092	.0000	.0000
14. Other transportation equipment	.0000	.0000	9.3906	1.7379	2.9069	.9785	.9038	.0000	.8823	4.6875
15. Other durables	1.2782	.7832	.5887	.9444	.7525	1.2296	.8748	1.7619	1.5209	.5603
16. Food and kindred products	.4135	1.6256	1.4212	1.4086	1.7333	1.2321	.7985	2.6296	.5628	1.0277
17. Textile mill products	.0000	.0000	.0000	.0000	1.0116	7.0857	.3302	.0000	.0000	.0000
18. Apparel and other textiles	.0000	1.7843	1.3378	1.1887	2.1394	.0000	.6685	.0000	.0000	.0000
19. Printing and publishing	1.0454	.9132	1.1115	1.2976	.8891	1.1338	.6476	1.8070	1.2222	.8962
20. Chemicals	.3905	1.2430	3.4230	1.2367	3.2493	.3762	1.1111	.0000	4.3325	1.1762
21. Rubber and misc products	.0000	.2812	.0000	.0000	1.4064	.7500	2.4391	.0000	.0000	.0000
22. Other nondurables	1.3542	1.4916	.4680	1.6521	2.3705	.8362	.7561	.7538	.7607	2.3389
23. Railroads and railway express	2.3214	.0271	.0000	1.1504	2.6666	.9946	.9505	1.2270	.9087	1.2531
24. Trucking service and warehousing	.8196	1.2406	1.0278	.8954	1.5873	1.0026	1.0240	.3906	.8166	.8928
25. Other transportation	1.2100	.6855	1.1562	1.0117	1.0800	.8654	1.0384	2.1697	.5181	3.1372
26. Communication	.7642	1.0982	.8762	1.0144	1.3820	1.0147	1.3750	1.1812	2.4444	.7522
27. Utilities and sanitary services	1.0258	1.1223	1.2564	1.2227	.4578	.9760	.8877	1.1666	.8470	1.6792
28. Wholesale trade	.9581	1.4718	.9472	1.2438	1.3167	.7392	.5683	1.3090	.9662	.8344
29. Food and dairy retailing	.5609	.9240	1.0137	.9749	.9555	1.0215	1.0894	1.1308	1.0683	1.6166
30. General merchandise variety	1.1666	.9972	.8704	.8952	1.0203	.7974	1.4342	1.2295	.5437	1.7976
31. Eating and drinking places	1.0000	.8019	.8144	.7400	1.2777	.6805	.5581	1.0323	1.5405	2.5689
32. Other retail trade	.9616	1.0347	.9602	1.1180	1.0416	1.0584	.8655	.8817	.8613	.8877
33. Finance, ins., and real estate	.8304	.9331	1.4332	.9588	1.0102	1.0660	.7500	1.0927	1.1739	1.1931
34. Business services	.3817	1.1129	1.0313	1.3779	2.7583	.6896	.9337	1.6005	1.3178	1.2037
35. Repair services	.0000	.7512	.8019	.8555	1.0909	1.1625	.6978	.9767	.9038	.9670
36. Hotels and lodging places	.2732	1.1600	1.1657	.9421	.6944	.7467	.9533	.9008	.5495	1.5625
37. Other personal services	1.3241	1.2317	1.0971	.7627	1.6000	1.0874	.9542	1.0020	.8398	1.9142
38. Entertainment	.7618	.7646	1.1001	.9952	1.7903	1.0933	1.2676	1.0970	.8228	.4971
39. Medical and other health services	1.0343	.4530	1.5961	.8881	.5000	.9050	1.1084	.9904	1.7021	1.0882
40. Educational services, government	.9453	.6592	.0000	.9848	.0000	.8906	.9787	.9387	.8750	1.7500
41. Educational services, private	1.0390	.2125	.2388	.7643	.7708	1.0851	.0000	1.0557	.9881	2.4545
42. Welfare, religion, nonprofit organ.	1.1951	1.0357	1.0000	1.0873	5.4444	.6157	2.5321	.8281	.5959	1.0000
43. Other prof. and related services	.9858	.7115	1.7340	.9925	.0000	1.2650	.5025	2.0617	.6800	6.2272
44. Public administration	.9894	.0000	.0000	1.0436	2.8888	.8711	.7102	.9726	.8614	1.9700
45. Industry not reported	1.1379	1.4667	.7079	1.7432	.8333	.8210	1.0400	1.0410	1.4932	.9873

Source: Same as Table 1.

TABLE 9

Montana's Relative Distribution of Occupations, by Industry, Compared to Wyoming/Idaho/Oregon/Washington

	Professional, Technical, & Kindred	Managers, Officials, & Proprietors		Clerical & Kindred	Sales Workers	Craftsmen	Operatives & Kindred	Service Workers	Laborers (Including Farm)	Occupation not Reported
		Salaried	Self-Employed							
1. TOTAL	.9302	.9965	1.7678	.8647	.9022	.8783	.7969	1.0976	1.0712	.9135
2. Agriculture, forestry, fisheries	.8435	.6276	1.2155	.9440	.3571	.5462	.8252	1.8235	.7660	.6000
3. Mining	.7809	.5738	.9282	.7506	.7878	.8926	1.1383	2.3703	.0000	1.8045
4. Construction	.9721	.9904	.9049	.9188	.3793	.9927	1.0235	1.1600	1.1101	1.1346
5. Manufacturing	.5868	1.1902	1.3160	.7932	1.5603	.9932	.9792	1.2426	1.1817	1.0487
6. Furniture, lumber, wood	.8209	1.3221	1.2863	.8587	2.1851	1.0695	.9634	.8028	.9838	.6810
7. Primary ferrous industries	1.1590	1.4917	.0000	.5430	1.0856	1.1682	.8141	1.7611	.6817	4.5942
8. Primary nonferrous industries	.5612	.6854	.0000	.6075	.0934	1.0238	1.0123	1.0873	1.7786	1.0424
9. Fabricated metals	.6841	1.2668	1.6079	1.3097	4.2838	.7182	.6695	1.5833	1.6584	.8066
10. Machinery, except electrical	1.2858	.7824	2.5544	.7231	1.7465	.9837	.7245	.9571	1.3809	.7790
11. Electrical machinery	.9994	1.2403	2.3304	1.2442	3.7134	1.0485	.4074	.0000	.0000	1.8482
12. Motor vehicles and equipment	.0000	6.9655	.0000	.0000	4.9361	.2566	.6756	11.8400	.0000	.0000
13. Aircraft and parts	.4308	.0000	.0000	.0000	126.9523	.5072	1.9317	13.8854	.0000	.0000
14. Other transportation equipment	.0000	.0000	6.4623	.9751	7.5000	.8469	1.4415	.0000	.7334	4.7619
15. Other durables	1.0566	.8181	.7157	.6808	.5265	1.2469	.9117	.8043	1.9153	.6632
16. Food and kindred products	.5680	1.3887	1.5904	1.1478	1.2635	1.1364	.8478	2.1257	.6671	1.2131
17. Textile mill products	.0000	.0000	.0000	.0000	4.4668	6.2260	.2813	.0000	.0000	.0000
18. Apparel and other textiles	.0000	2.4617	3.4076	.9147	5.5254	.7185	.6232	.0000	.0000	.0000
19. Printing and publishing	1.1784	.9249	1.0590	1.0363	.9067	1.0945	.8452	1.3376	.8750	.9166
20. Chemicals	.3678	.8036	1.1866	.8302	1.8587	.5242	1.2256	.0000	5.6920	2.0859
21. Rubber and misc. products	.0000	.8196	.0000	1.4928	3.5913	.6544	.4648	.0000	.0000	10.6730
22. Other manufacturing	2.4070	1.5822	1.0232	1.7663	1.9169	1.0710	.5805	.3141	.9111	.7582
23. Railroads and railway express	.5803	.9449	.0000	.8848	.4000	1.0755	.9838	.8345	1.1543	.9000
24. Trucking service and warehousing	.4347	1.1333	1.5844	.6627	.8620	.9960	1.0816	.4166	.7943	.7500
25. Other transportation	1.2246	.4551	1.0829	1.0082	.4909	1.1891	1.5490	.7390	.1660	1.8181
26. Communication	.7939	1.2340	1.7000	1.0144	1.1770	.9485	1.5714	1.5187	.7096	.7024
27. Utilities and sanitary services	.7647	1.3519	1.0000	1.0560	.7310	.9983	.8609	.9271	1.0534	1.6635
28. Wholesale trade	.7261	1.4764	1.1756	.9078	.9207	.8664	.7628	1.8461	1.2367	1.1203
29. Food and dairy retailing	.6388	.9801	.9789	.9442	1.0195	.9895	1.1092	1.1134	.8661	1.3857
30. General merchandise variety	.3111	1.1842	1.5306	.6880	1.1195	.6938	.9316	.8211	.4971	1.2583
31. Eating and drinking places	1.7692	.8233	.8190	.6636	1.4838	.8448	.5581	1.0265	1.9655	1.6555
32. Other retail trade	.8807	1.0646	1.0373	1.0760	.9404	1.1013	.9029	1.0981	.9480	1.0235
33. Finance, ins., and real estate	.7318	1.0183	1.5632	.9701	.9537	.7434	.7741	.9102	1.7560	1.1413
34. Business services	.7729	1.1841	.8824	1.0263	2.1676	.9849	1.0763	.6833	1.1333	1.4772
35. Repair services	.0000	.8147	.9058	.8230	1.3571	1.1520	.6531	.9545	.8086	1.2394
36. Hotels and lodging places	.3098	1.0447	1.1612	.9328	.8620	.8000	1.2032	.9730	.9242	1.4705
37. Other personal services	1.3035	.9619	1.2604	.6411	1.0000	.9431	1.0488	1.0092	.6924	1.8108
38. Entertainment	.5734	.8013	1.1833	.9890	1.8141	1.2512	1.5168	1.1179	.9159	.7747
39. Medical and other health services	1.0043	.6686	1.1369	.7705	.4285	.9814	1.2602	1.0735	1.5686	2.2236
40. Educational services, government	.9836	.5597	.0000	.8458	.0000	.5570	.5411	.9797	1.0370	1.3770
41. Educational services, private	1.1691	.5073	.3333	.6318	.4252	.5312	.0000	.8497	.8250	.8437
42. Welfare, religion, nonprofit organ.	1.1074	.8061	1.1136	.8890	.4188	.5683	1.0036	1.0578	.7515	1.4000
43. Other prof. and related services	.9218	.6471	1.9638	1.0715	.0000	1.8421	.0607	2.8793	1.2142	3.0444
44. Public administration	1.0204	.3995	.0000	.9919	2.6000	.7711	.7660	.9025	.8137	1.6722
45. Industry not reported	.9801	.7179	.7291	.8486	.6521	.6666	.8581	.9620	1.0940	1.0121

* Not [illegible]

TABLE 10

Montana's Relative Distribution of Occupations, by Industry, Compared to the United States

	Professional, Technical, & Kindred	Managers, Officials, & Proprietors		Clerical & Kindred	Sales Workers	Craftsmen	Operatives & Kindred	Service Workers	Laborers (Including Farm)	Occupation not Reported
		Salaried	Self-Employed							
1. TOTAL	1.0026	1.1100	2.1666	.8130	.9135	.9082	.6315	1.1253	1.4531	.6016
2. Agriculture, forestry, fisheries	1.7265	.7108	1.0734	1.6619	.2500	.9701	.7203	3.3214	.8567	.8571
3. Mining	1.1309	.6997	.8778	.7636	.5777	.9441	1.0304	2.5600	.0000	1.4144
4. Construction	1.3534	1.0562	1.1023	.9168	.2894	.9530	1.2780	1.1372	.8436	.7866
5. Manufacturing	.6596	1.2512	2.3608	.6518	1.8266	1.1271	.7843	1.0432	2.4232	.7166
6. Furniture, lumber, wood	.9172	1.2274	1.0481	.6227	.7283	1.1812	.8637	.9344	1.2579	.4188
7. Primary ferrous industries	1.2554	2.9626	.0000	.5606	3.7294	1.1085	.9054	1.6861	.3950	3.5418
8. Primary nonferrous industries	.5701	.5579	.0000	.3819	.0540	1.1151	1.0597	1.2108	2.1334	.8776
9. Fabricated metals	.4691	1.5995	3.8421	1.0853	8.1565	.9376	.5869	.9870	1.4922	.6436
10. Machinery, except electrical	1.1851	1.1627	8.1326	.5484	4.0090	1.3607	.4852	.4685	.7463	.4557
11. Electrical machinery	1.2743	1.9876	9.5714	1.1126	12.7823	1.1332	.3163	.0000	.0000	1.4565
12. Motor vehicles and equipment	.0000	18.8305	.0000	.0000	22.4936	.3829	.3711	4.1690	.0000	.0000
13. Aircraft and parts	.5993	.0000	.0000	.0000	56.7234	.5194	1.0056	8.2795	.0000	.0000
14. Other transportation equipment	.0000	.0000	10.0166	.8825	5.8593	1.0296	1.1437	.0000	.5154	1.9607
15. Other durables	.8544	1.1070	2.2402	.4722	1.0170	1.4153	.8374	.2740	2.0673	.3473
16. Food and kindred products	.5615	1.5197	2.2876	1.0622	1.0119	1.2115	.8825	1.5638	.5946	.8554
17. Textile mill products	.0000	.0000	.0000	.0000	15.0247	5.3605	.2720	.0000	.0000	.0000
18. Apparel and other textiles	.0000	3.4184	6.7448	1.2187	10.9121	.8346	.5495	.0000	.0000	.0000
19. Printing and publishing	1.2067	1.0017	1.5823	.7376	1.5066	.9645	.4742	.9279	.6936	.7707
20. Chemicals	.5025	.7881	1.5614	.6968	2.3087	.5869	1.0272	.0000	3.4295	1.3024
21. Rubber and misc. products	.0000	2.8344	.0000	1.3918	16.8663	.5803	.3512	.0000	.0000	2.3813
22. Other nondurables	2.7864	1.5594	.8000	1.2047	1.8000	1.4761	.5429	.2951	1.1627	.5842
23. Railroads and railway express	.3385	.9163	.0000	.8486	.4210	1.1753	1.0152	.5776	1.1482	.8250
24. Trucking service and warehousing	.7042	1.3214	1.8468	.6632	.7751	1.0983	1.0537	.3246	.7507	.6636
25. Other transportation	1.2656	.6949	1.7343	.8406	.4153	1.0260	1.2037	.8615	.3579	1.6526
26. Communication	.8736	1.4005	3.4000	.9421	1.5092	1.0115	.8048	1.2704	.4583	.6854
27. Utilities and sanitary services	.9623	2.0400	1.4848	.9765	.8365	.9406	.8399	.8000	1.0136	1.4009
28. Wholesale trade	.6310	1.5339	1.2906	.8398	.8520	.9402	.8030	1.5483	1.5606	.8287
29. Food and dairy retailing	.6571	1.2142	.9624	.8202	1.0364	.8520	1.0149	1.1588	1.1564	.8508
30. General merchandise variety	.3134	1.2886	1.4950	.7115	1.0915	.7142	.8515	.8687	.3507	1.1005
31. Eating and drinking places	1.6197	.6144	.8693	.4983	.7244	.6202	.5287	1.0592	2.0357	1.1530
32. Other retail trade	.9160	1.1603	1.2264	1.0700	.8863	1.1505	.8885	.6858	.8463	.7372
33. Finance, ins., and real estate	.5753	1.1137	2.3903	.9016	1.0757	.5947	.5217	.7635	1.5882	.9055
34. Business services	.5557	1.0534	1.2226	.9839	1.0797	1.1744	.8802	1.0206	1.2108	.9554
35. Repair services	.7000	.8898	1.1959	.9188	1.4430	1.1025	.6648	.7777	.7175	1.1130
36. Hotels and lodging places	.2166	1.1632	1.9193	.8837	.6756	.7087	.8555	.8903	.8714	1.0273
37. Other personal services	1.3562	.9266	1.3550	.6371	.6666	.9386	.9847	.9957	1.0690	1.2641
38. Entertainment	.4750	.7728	1.5859	.9475	1.7826	1.2352	.8400	1.2241	.0677	.5815
39. Medical and other health services	.4750	.7602	1.8141	.8215	.3750	.8122	1.1174	1.1141	1.7021	1.5645
40. Educational service, government	.9561	.5144	.0000	.9848	.0000	.7057	.3411	.0823	.0491	1.2172
41. Educational services, private	1.2166	.1900	.3200	.3566	.6981	.1500	.0000	.8547	.0166	.5684
42. Welfare, religion, nonprofit orgn.	.9885	1.1000	1.4848	.8179	.7205	.5150	1.2857	1.1814	.9291	1.5085
43. Other prof. and related services	.9143	1.1000	1.0000	1.1734	.0000	1.0243	.7843	1.3567	.8947	1.7564
44. Public administration	1.1613	1.1944	.5000	.9654	.1666	.7511	.6857	.9183	.6820	1.2134
45. Industry not reported	1.5000	1.1000	.0000	1.2000	.9818	1.0120	1.2429	1.7258	.3643	.0984

Source: Census of Population, 1970

The occupational mix of employment in Montana's industries may be compared to that in each of the three comparison regions by reading across the rows of tables 8, 9, and 10. An entry greater than one implies that the Montana industry has a larger proportion of its employment in that occupation than does the comparison region. Conversely, a value less than one corresponds to a greater proportion in the comparison region. The closer the entries in any row are to one, the more similar are the occupational distributions of Montana and the comparison region for that industry.

The large differences between the occupational mix in the same industry between Montana and the comparison regions is surprising.[11] For example, in agriculture, forestry, and fisheries, Montana has proportionally one-third times as many "professionals" but only two-thirds as many salaried managers, sales workers, and craftsmen than does the Wyoming/Idaho region. Using the United States as a comparison, we have almost twice as many "professionals" but only a quarter as many sales workers in this industry. In a similar manner, the occupational distribution of each Montana industry may be compared to its counterpart in Wyoming/Idaho, in Wyoming/Idaho/Oregon/Washington, and in the United States.[12]

The variations in the occupational structure in Montana and the comparison regions may be looked at as caused by differences in the supply or demand for the various occupations. For example, if the supply function

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11. The occupational distribution of employment in each Montana industry is statistically different, at least at the .01 level of significance, from that of the same industry in each of the comparison regions.

12. Entries of zero and larger than 3.5 should be ignored. If either Montana or the comparison region had no employment in a particular industry-occupation cell, the computer was programmed to enter a zero. The large values result from an industry being very small and having an unrepresentative occupational distribution in Montana or the comparison region, e.g., the steel industry represented by only a sales office.

of a certain occupation in Wyoming/Idaho were different from that of Montana, one would expect identical industries in the two areas to adjust their production processes so as to employ different proportions of this occupation. Similarly, if the technical conditions are different, i.e., if the industry has a different production function in each region, the demand for labor functions would be dissimilar and lead to different mixes of occupational employment.[13]

Earlier, when the occupational distributions of employment between Montana industries were compared, it was possible to explain the different employment patterns by differences in the demand for the various occupations.[14] However, when Montana is compared to another region, it becomes increasingly inappropriate to assume that either the supply of demand functions are identical in both areas. Consequently, analysis of employment differences between regions, because they may be due to dissimilar supply functions, demand functions, or both, requires a more elaborate framework.

Ideally, every Montana industry should be compared with its counterpart in each of the comparison regions and the cause of the differentials in the occupational mix examined. However, this would involve over 1,200 individual calculations and, even more important, sufficient data is not available for analysis at this disaggregated level. Thus, in order to reach any conclusions concerning the causes of the different occupational

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13. One difficulty with using census data is the non-homogeneity of "industries" which produce different products in the various regions. Obviously, the product of the motor vehicle and equipment industry in Montana, sales and service, is different from that of the same "industry" in the United States as a whole: sales and service plus production of motor vehicles. This problem may be treated by viewing the differences in those industries as simply an extreme case of different technical conditions of production. Analysis may then proceed as if the industry had different production functions in the various regions. It would be preferable, of course, to have less highly-aggregated data.

14. This was done by assuming each Montana industry faced an identical supply of labor function for the various occupations.

distributions, the data must be aggregated across industries, even at the cost of accepting the difficulties associated with this procedure.

The first row of table 7 presents the relative distribution of total employment by occupation for the state of Montana. Equivalent computations have been made for each of the comparison regions and are reproduced, along with Montana's, as lines A1, B1, C1, and D1, of table 11. Comparing the raw occupational distributions reveals considerable differences between Montana and the comparison regions.

This state's economic reliance on agriculture is emphasized by the large proportion of employment in the manager, self-employed occupation. Montana's 15.08 percent compares with 14.51 percent for Wyoming/Idaho, 8.53 percent for Wyoming/Idaho/Oregon/Washington, and 6.96 percent for the United States. It is also notable that the 10.74 percent classified as laborers, which includes farm labor, far exceeds the national average of 7.04 percent. Montana's greatest relative defficiency is apparently in the operative and clerical occupations. This state has 11.62 percent of the labor force in the operative and kindred occupation. This compares with 13.61 percent, 14.58 percent, and 18.40 percent for the Wyoming/Idaho, Wyoming/Idaho/Oregon/Washington, and the United States, respectively. The clerical and kindred occupation accounts for 11.70 percent of Montana's employment, while the corresponding entries for the comparison regions are 10.94 percent, 13.53 percent, and 14.39 percent.

A measure of overall differences in the occupational structure of Montana and the three comparison regions may be obtained by taking the sum of the absolute differences of the proportions employed in each occupational class between this state and each of the comparison regions. The sum of the absolute differences in each occupation between Montana and Wyoming/Idaho is .0672. The corresponding calculation for Montana compared to the four-state

region and the United States yields .1668 and .2660.[15] The difference between the occupational structure in Montana and the comparison regions is enlarged as the heterogeneity of the latter is allowed to increase.

The aggregated occupational distributions of lines A1, B1, C1, and D1 of table 11 have drastically reduced the number of computations needed to compare Montana and each of the other regions, but they introduced still another cause of variation in the interstate occupational distributions. Each industry in Montana and a comparison region could have identical supply and demand for labor functions, but differences in the distribution of total occupational employment would still arise because of differences in industry mix. That is, the proportion of total Montana employment in an occupation may differ from that of a comparison region due to variations in the demand or supply of labor functions and because one or the other may have a concentration (lack of concentration) in industries which a large (small) portion of its employees in the occupation under study. Thus, in order to eliminate this new source of variation, theoretical occupational distributions that Montana and the comparison regions would have if they had the same industrial structure as did the United States were computed.[16]

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15. Let E_i^M and E_i^{US} be the proportion of total employment in occupation i for Montana and the U.S. Then $.2660 = \sum_{all\ i} \left| E_i^M - E_i^{US} \right|$.

16. Let E_i^m, E_i^1, E_i^2, and E_i^3 be the proportion of employment in occupation i in Montana and the three comparison regions. We may think of each E_i as being an average of the proportion of each industry's (j) employment in occupation i weighted the importance of industry j in the region, e.g., $E_i^m = \sum_{all\ j} a_j^m E_{ij}^m$, $E_i^1 = \sum_{all\ j} a_j^1 E_{ij}^1$, etc. Where the a_j's are the employment in industry j as a proportion of total employment. Thus, when we compare E_i^m with the other regions, differences may arise because of the practices of individual industries (the E_{ij}'s) or different industrial structure (a_j's). The industry constant distributions were calculated by using the relative importance of the industries in the United States, the a_j^3's. Thus, $E_i'^m = \sum_{all\ j} a_j^3 E_{ij}^m$, $E_i'^1 = \sum_{all\ i} a_j^3 E_{ij}^1$, etc. Note that the raw and industry constant distributions for the United States are identical because its industrial structure is used as the base.

TABLE 11

Occupational Employment Distributions and Income

	Montana	Professional, Technical, and Kindred	Managers, Officials, and Proprietors		Clerical and Kindred	Sales Workers
			Salaried	Self-employed		
A1	Raw distribution	.1121	.0585	.1508	.1170	.0655
A2	Standardized distribution	.1094	.0702	.0850	.1251	.0963
A3	Annual income	5,530	6,236		3,236	3,957
A4	Relative income	1.341	1.511		.784	.959
	Wyoming/Idaho					
B1	Raw distribution	.1090	.0583	.1451	.1094	.0611
B2	Standardized distribution	.1217	.0667	.0829	.1238	.0775
B3	Annual income	5,693	6,110		3,215	3,830
B4	Relative income	1.369	1.470		.774	.922
	Wyoming/Idaho/ Oregon/Washington					
C1	Raw distribution	.1205	.0587	.0853	.1353	.0726
C2	Standardized distribution	.1143	.0606	.0730	.1368	.0769
C3	Annual income	6,418	7,172		3,477	4,618
C4	Relative income	1.376	1.538		.745	.990
	United States					
D1	Raw distribution	.1118	.0527	.0696	.1439	.0717
D2	Standardized distribution	.1118	.0527	.0696	.1439	.0717
D3	Annual income	6,715	6,867		3,590	4,769
D4	Relative income	1.492	1.526		.798	1.060

Sources: Occupational Employment Distribution: U.S. Department of Commerce, Bureau of the Census, U.S. Census of Population: 1960, Detailed Characteristics, Montana, Final Report PC CD-28D (Washington, D.C.: U.S. Government Printing Office, 1962), table 125.

Annual Incomes: Ibid., tables 124 and 208.

Note: The raw and standardized distributions, rows 1 and 2, give the proportion of the employed. For example, 11.21 percent of Montana's employed are in the professional, technical, and kindred occupation. Annual incomes are in dollars. Relative income is the average income in each occupation as a proportion of the average income for the state or region.

TABLE 11--Continued

	Montana	Craftsmen	Operatives and Kindred	Service Workers	Laborers, Including Farmers	Occupation Not Reported
A1	Raw Distribution	.1228	.1162	.1343	.1023	.0286
A2	Standardized distribution	.1438	.1386	.1116	.0659	.0477
A3	Annual income	5,087	4,002	1,950	2,613	3,483
A4	Relative income	1.233	.970	.473	.633	.844
	Wyoming/Idaho					
B1	Raw distribution	.1313	.1361	.1136	.1074	.0281
B2	Standardized distribution	.1403	.1606	.1089	.0683	.0453
B3	Annual income	5,370	4,022	1,876	2,627	3,575
B4	Relative income	1.292	.968	.451	.632	.860
	Wyoming/Idaho/ Oregon/Washington					
C1	Raw distribution	.1398	.1458	.1137	.0955	.0324
C2	Standardized distribution	.1421	.1659	.1091	.0725	.0451
C3	Annual income	5,665	4,363	2,215	3,195	4,046
C4	Relative income	1.215	.935	.475	.685	.867
	United States					
D1	Raw distribution	.1352	.1840	.1109	.0704	.0492
D2	Standardized distribution	.1352	.1840	.1109	.0704	.0492
D3	Annual income	5,435	3,813	2,182	2,647	3,974
D4	Relative income	1.208	.847	.485	.588	.883

These "standardized" distributions are denoted as rows A2, B2, C2, and D2 of table 11.

The standardized distributions tell a somewhat different story than the raw estimates. Also, these distributions are more appropriate for comparisons because they eliminate the influence of differing industry mixes. In Montana, once the correction for industry structure has been made, the proportion of employment in the self-employed manager occupation, which includes family farms, is only 8.50 percent. This is still larger than the national average of 6.96 percent, but not by as great a margin as indicated by the raw distribution. Even more interesting is the fact that the standardized estimate for the laborers occupation in Montana, 6.59 percent, is below the corresponding entry of 7.04 percent for the United States. This indicates that this state's seeming preponderance of laborers is only because we have a disproportionate abundance of industries which employ this type of labor. The Montana occupation with the largest deficiency, when compared to the United States, remains the operatives and kindred classification. The standardized estimate for Montana is 13.86 percent. This compares with 16.00 percent, 16.59 percent, and 18.40 percent for Wyoming/Idaho, the four-state region, and the United States. The standardized estimate for the proportion of Montana's employment in the clerical occupation is 12.71 percent. This value is nearer to that of the United States, 14.39 percent, than is the corresponding value from the raw occupational distribution. Finally, the relative shortage indicated in the sales and craftsmen occupations, with respect to the United States, actually turns out to be, after the industry adjustment, a case of relative abundance in Montana.

Standardization of the industry mix tends to reduce the overall differences between the occupational distribution of Montana and the three comparison regions. The sum of the absolute differences in each occupation, after adjusting for industry, between Montana and Wyoming/Idaho is .0710. The corresponding values for the four-state region and the United States are .0983 and .1338. Correcting for the industrial composition has little effect on the differences between Montana and Wyoming/Idaho, but reduces divergence from the four-state region by one-third and that from the United States by one-half. However, it is crucial to realize that there are still sizable differences between the occupational mix in Montana and in the three comparison regions which remain unexplained.[17]

Before proceeding, it may be helpful to review what has been discussed. This section began with a presentation of Montana employment cross-classified by industry and occupation. Looking only at this state, the variation in the occupational mix between industries may be assigned to differences in the industries' demands for workers in those occupations. Next, the employment distribution for each Montana industry was compared to its counterpart in the three comparison regions. Large differences in the occupation distributions of identical census industries were noted. However, because of the many possible causes, no single explanation could be given. Finally, the aggregate distribution of occupations for Montana was compared to the corresponding magnitudes representing the comparison regions. It

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17. A "Chi-Square Goodness of Fit" test was applied to the frequency tables implied by the standardized occupational distributions. It was found that, at the .01 level of significance, the Montana distribution, taken as a whole, was different from that of any of the comparison regions.

was found that differences in the industry mix accounted for a large portion of the divergence in distributions for two of the three comparison regions. It is with these "unexplained" differences in occupational distributions that the following section is concerned.

B. A Supply and Demand Explanation

Up to this point, the study has made use of description and simple analytical tools to shed light on the distribution of employment by occupation in Montana. These devices are straightforward and relatively easy to understand. However, they take us only so far. To analyze further the occupational distribution of Montana's labor force requires a much more complicated and speculative set of tools. But, as is often the case, acceptance of this more complicated approach, and its application to the situation at hand, gives the researcher a powerful tool for analysis.

In order to formulate workable plans for economic growth, it would be desirable to be able to examine the employment distribution of Montana and to be able to state that there are "too many" of one occupation and "too few" of another. With this observation in mind, policies could be instituted to rectify the apparent imbalance. However, economic analysis shows that examination of only observed magnitudes is not sufficient to establish the existence of abundance or scarcity. Such conclusions usually become meaningless when the underlying causes of the situation are discovered.[18] Because of this, this section will be concerned with more than just the existence of abundance or scarcity and will attempt to provide an explanation for their occurrence.

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18. For example, examining the number of automobiles per capita in the United States and England, one may conclude that the former has too many and the latter too few. But, when the relative prices of autos in the two countries are compared, the reason for the divergence is obvious.

Economic theory states that the price of labor, or wage per labor unit, is an important argument in the determination of labor market equilibrium. Unfortunately, no wage information with broad coverage of the occupational employment series is available and, equally important, the employment data is measured in number of employees and not labor units. However, annual income information for Montana and the comparison regions is available for each census occupation, and is presented as rows A3, B3, C3, and D3 of table 11.[19]

Traditional economic analysis derive a downward sloping demand curve for the services of specific inputs from the production function. This provides the basis for positing a similarly sloped demand function for each occupation. Likewise, the supply of labor services in each occupation may be conceived as being positively related to the wage per labor unit. If (1) average annual incomes are proportional to the wage per unit,[20] and (2) the number of labor units per worker remains constant,[21] the workings of the occupational labor markets are concisely represented by a demand and supply function for each occupation. The intersection of these functions,

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19. Incomes by occupation are available only in the form of frequency distributions by income class. To compute average incomes, it was assumed that each member of a class received the midpoint income. The midpoint of the "$10,000 and over" class was assumed to be $20,000.

20. To many people, annual income is the product of the wage and the number of units of labor services provided. Thus it is under the control of the worker and, to the extent that he changes the number of labor units supplied in response to wage changes, it is a result, rather than the cause, of behavior.

21. An increase in labor units per worker would shift the demand function for the number of employees inward or the supply curve outward. Opposite shifts would result from a corresponding decrease. The restrictiveness of the assumption of constant labor units per worker is illustrated by its implication that employers hire or fire and employees enter or leave an occupation rather than changing the number of hours worked.

which represents the interaction of demand and supply factors, determines the levels of income and employment which will prevail in each occupational labor market.

If the observed points represent equilibrium, the standardized occupational distributions and the annual incomes, combined with the previous assumptions, may be used to find the points at which the supply and demand functions for each occupation intersect. For example, in the Montana clerical and kindred occupation, the values of .1251 and $3,236 are the coordinates of the intersection of the supply and demand functions for this occupation, presented in figure 1.

The occupational incomes presented as rows A3, B3, C3, and D3 are not ideally suited for interregional comparison. For numerous reasons, the general levels of income for all occupations may be higher in one region than in another. For example, the overall level of incomes and living costs may be lower in Montana. In this case, simple comparisons of income would not accurately reflect interregional differences. In order to correct for these divergent levels of living, occupational incomes in each region were divided by the average income for that area to obtain a relative, or real, income for each occupation.[22] In figure 1, .784 is the relative income for the clerical occupation in Montana. Relative incomes are presented as rows A4, B4, C4, and D4 of table 11.

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22. The average income level for each region was obtained by computing a weighted average of the occupational incomes using the distribution of occupations in the United States as the common weighting pattern. Notice that relative income is a pure number.

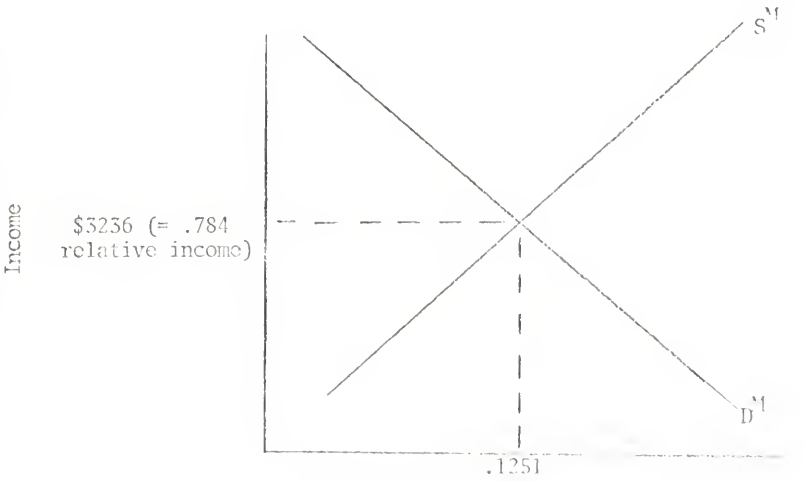
Income
$3236 (= .784
relative income)
S^M
D^M
.1251
Proportion in Clerical Occupation

Figure 1.

Assume, for the moment, that Montana and a comparison region have identical supply and demand functions for an occupation. In this situation, the relative income and standardized proportion of employment would be the same in both.[23]

Next, assume that Montana and the comparison region have identical supply functions, but that the demand function for the comparison region is above and to the right of Montana's. This situation would not be inconsistent with an observation of higher income and employment in the comparison region. Such an instance is represented in figure 2. Conversely, if the demand curve of the comparison region is below Montana's, its income and employment will be below that of this state.

Assume next that the demand curves for Montana and the comparison region are identical, but that the comparison region's supply curve is to the right of Montana's, as pictured in figure 3. This situation would not be inconsistent with an observation of higher employment but lower income in the comparison region. Conversely, higher income and lower employment would not be inconsistent with a supply curve to the left of Montana's. Notice that different supply curves, tracing out the equilibrium points on the common demand curves, imply that the sign of the difference between employment in Montana and the comparison region--e.g., $E_i^M - E_i^{RI}$--will be opposite from the comparable computation --$I_j^M - I_j^{RI}$--performed in the incomes (notation explained in footnote 15 above). Contrariwise, coincidence of the sign of the differences between the incomes and employments is not inconsistent with identical supply but different demand functions.

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23. It is assumed that the labor units per worker are equal in Montana and the comparison region. If this is not true, identical supply and demand functions for labor services may still be consistent with differences in employment.

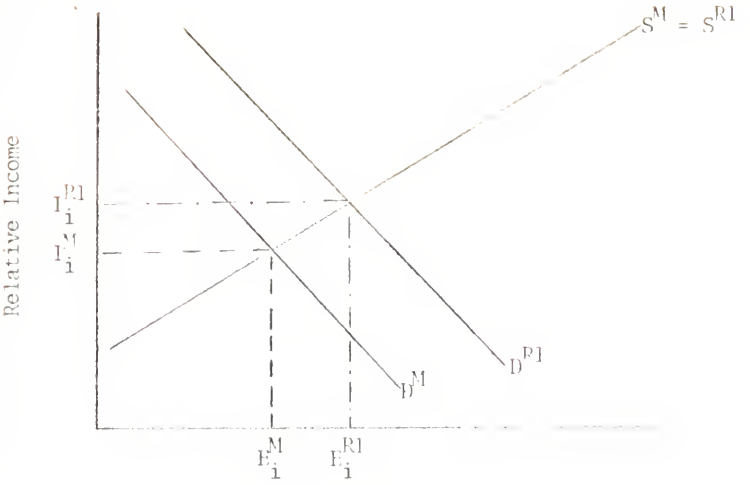

Figure 2.

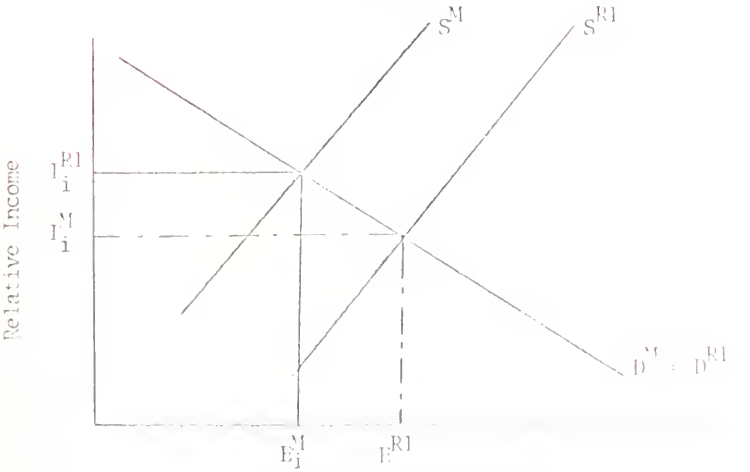

Figure 3.

Only a fortuitous accident would lead to Montana and a comparison region having identical supply or demand functions. However, this does not invalidate the essence of the previous argument. The observable data--for example, higher income and employment in the comparison region--is not inconsistent with a hypothesis which states that both supply and demand functions of the comparison region are different from those of Montana, but the relative difference of the latter is greater than the former. For example, let S^M, D^M, S^{RI}, and D^{RI} be the relevant functions for Montana and a comparison region. In figure 4, both the demand and the supply curves of the comparison region are different with respect to the Montana position. However, the demand function of the comparison region is relatively "more different" with respect to Montana's than is the supply curve. Figure 5 shows that lower employment and higher income in the comparison region is not inconsistent with the difference in supply functions being relatively "more different" than the difference in demand functions.[24]

Situations in which the differences in demand curves between Montana and the comparison region are relatively greater than the differences in the supply curves will be denoted as "demand domination." In other words, differences in demand are relatively more important than differences in supply in explaining the variation in relative income and standardized employment between Montana and a comparison region. The term supply domination, on the other hand, denotes a situation in which the difference in supply is relatively greater than that of demand.

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24. The pictured examples all use linear and parallel functions. Nonlinear and nonparallel functions are not inconsistent with the explanation as long as the above relations hold in the region around the equilibrium point.

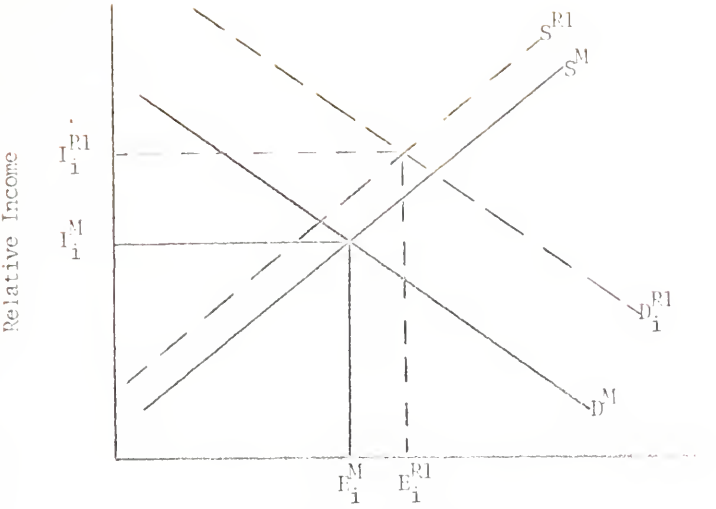


Figure 4.

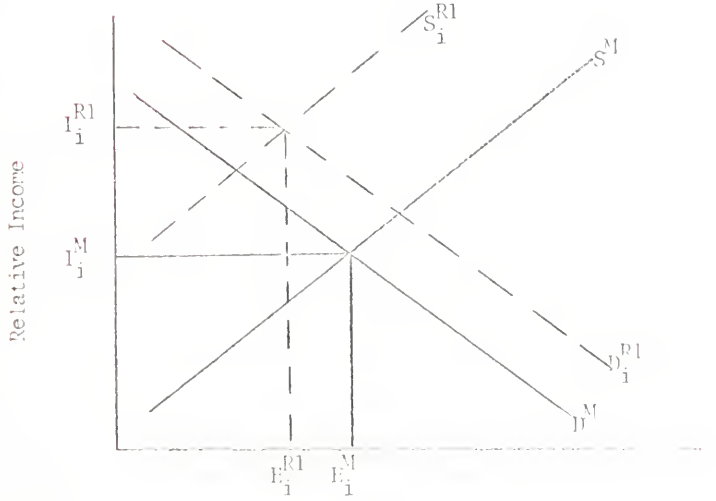


Figure 5.

Alternatively, through the coordinates specified by Montana's income and employment, the intersection of the supply and demand for this state, one can construct a new set of axes, as shown in figure 4. Supply domination will be indicated if the income and employment coordinates of the comparison region fall in quadrant II or IV. Conversely, the intersection of the comparison area's demand and supply functions in quadrants I and III suggests demand domination. Or, opposite signs for the income and employment differences implies that the equilibrium of the comparison region falls in II or IV and denotes supply domination. On the other hand, coincidence of signs indicates demand domination.

Several examples may help to clarify this explanation. The coordinates of the equilibrium point for the clerical occupation in Montana, .1251 employment and .784 relative income, may be obtained from table 11. Similarly, the intersection of the supply and demand functions in the operatives market may be denoted as .1386 employment and .970 income. These two markets are presented in figures 5 and 6. If Wyoming/Idaho is used as the comparison region, the corresponding information for this region may be read from table 11. For the clerical occupation, employment and income are lower in the comparison region than for Montana, indicating an intersection in quadrant III. In other words, the differences between employments and incomes are both positive, that is, $E_i^M - E_i^{W+Id} > 0$ and $I_i^M - I_i^{W+Id} > 0$. This situation indicates that Wyoming/Idaho has a demand function below Montana's, and a supply above or below the corresponding function for this state. Likewise in the operative market, opposite signs for income and employment differences indicate supply domination and denotes a Wyoming/Idaho supply function below Montana's and a demand function above or below this state's.

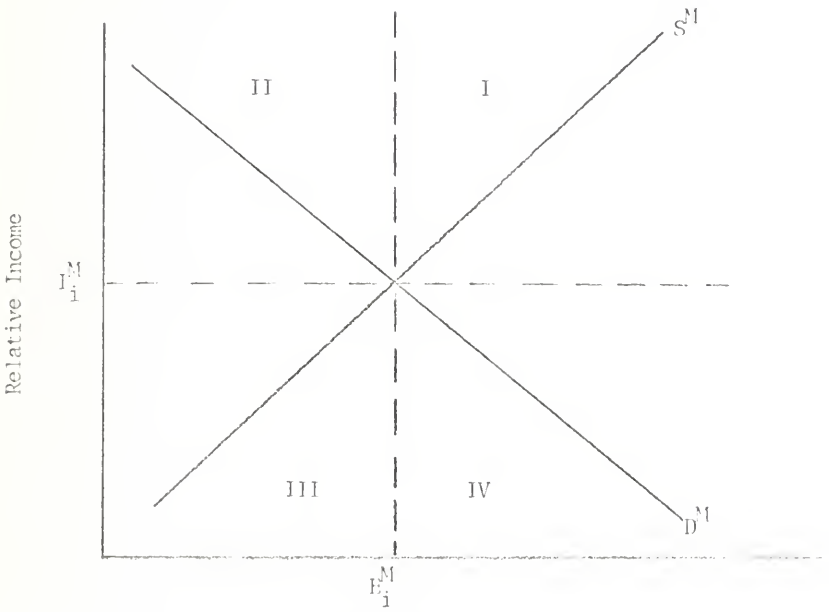
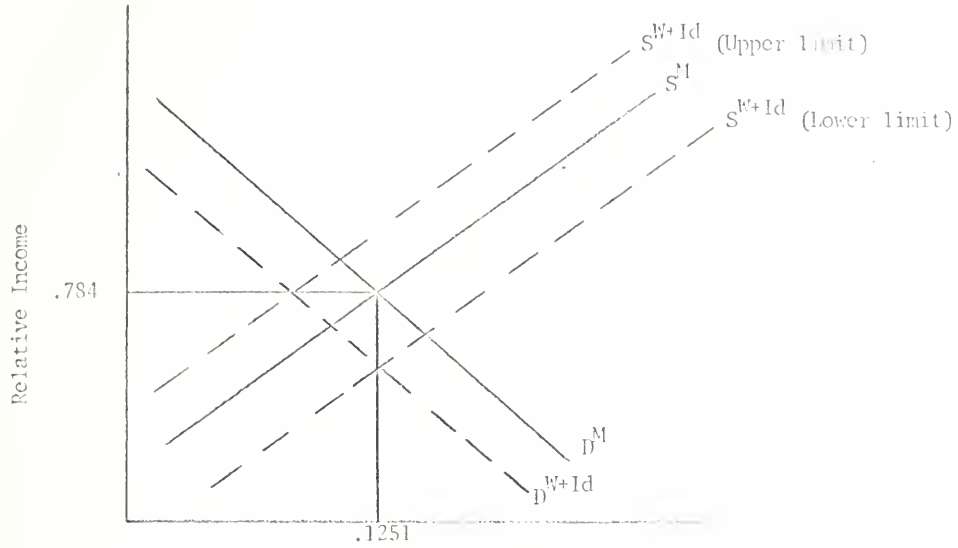
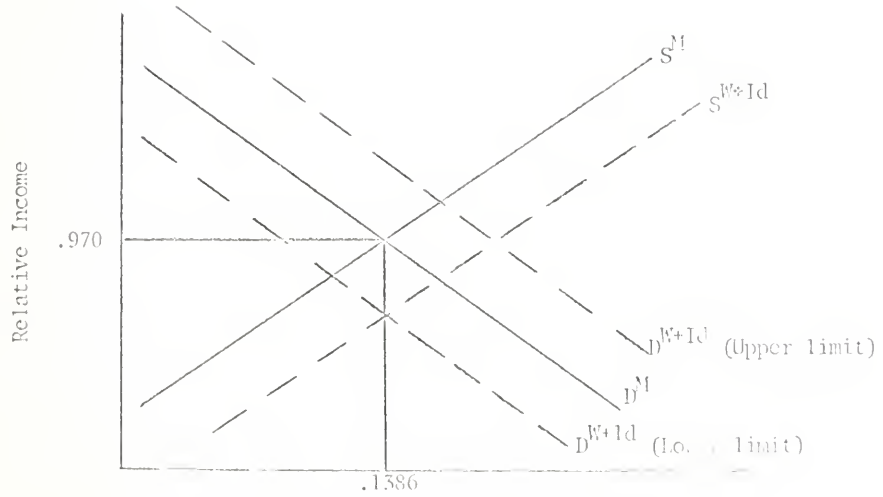

Relative Income
S^M
II
I
I_i^M
III
IV
D^M
E_i^M
Proportion in Occupation i

Figure 6.



Proportion in Clerical Occupation

Figure 7.



Proportion in Operative Occupation

Figure 8.

Table 12 facilitates making inferences concerning supply or demand domination. The differences between relative incomes and standardized employments in Montana and the comparison region have been entered in the appropriate cells. Examination of the signs of the two differences reveals supply or demand domination. For example, with the United States as the comparison region, the signs are opposite in the craftsmen occupation and suggest supply domination.[25]

Supply and demand domination allow inferences to be made concerning conditions in particular markets. However, care must be exercised and only under certain situations may comparisons be made between markets. Supply and demand domination may be used to determine the relative positions of either the demand or supply of labor function, but never both. For example, in the case of the clerical occupation, the demand curve of the comparison region is definitely to the left of Montana's but nothing may be concluded concerning the relative positions of the supply curves. Moreover, one is unable to compare functions between markets, e.g., between clerical and operative occupations, and only under very special cases can one compare regions for the same occupation.[26]

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25. Separate income estimates were not available for self-employed and salaried managers, officials and proprietors. But, since the signs of both total employment differences coincide, inferences may still be made.

26. For example, in the clerical occupation, the supply and demand intersection for Wyoming/Idaho is above and to the right of Montana's, while that of the United States is below and to the left. From this it may be inferred that the demand function for clerks in Wyoming/Idaho is "above" that of the United States.

TABLE 12

Montana's Standardized Occupational Distribution and Relative Income Compared to Other Regions

Wyoming/Idaho	Professional, Technical and Kindred	Managers, Officials, and Proprietors		Clerical and Kindred	Sales Workers
		Salaried	Self-Employed		
Adjusted Employment ($E_i^M - E_i^R$)	-.012	+.004	+.002	+.001	+.019
Relative Income ($I_i^M - I_i^R$)	-.028	+.041		+.010	+.037
Domination	Demand	Demand		Demand	Demand
Wyoming/Idaho/Oregon/Washington					
Adjusted Employment ($E_i^M - E_i^R$)	-.005	+.010	+.012	-.012	+.019
Relative Income ($I_i^M - I_i^R$)	-.035	-.027		+.039	-.031
Domination	Demand	Supply		Supply	Supply
United States					
Adjusted Employment ($E_i^M - E_i^R$)	-.002	+.018	+.015	-.019	+.025
Relative Income ($I_i^M - I_i^R$)	-.151	-.015		-.014	-.101
Domination	Demand	Supply		Demand	Supply

Source: U.S. Department of Commerce, Bureau of the Census, U.S. Census of Population: 1960, Detailed Characteristics, Montana, Final Report PC CD-2. (Washington, D.C.: U.S. Government Printing Office, 1962), table 125.

TABLE 12--Continued

Wyoming/Idaho	Craftsmen	Operatives and Kindred	Service Workers	Laborers, Including Farmers	Occupation Not Reported
Adjusted Employment ($E_i^M - E_i^R$)	+.004	-.022	+.003	-.002	+.002
Relative Income ($I_i^M - I_i^R$)	-.059	+.002	+.022	+.001	-.016
Domination	Supply	Supply	Demand	Supply	Supply
Wyoming/Idaho/Oregon/Washington					
Adjusted Employment ($E_i^M - E_i^R$)	+.002	-.027	+.003	-.007	+.003
Relative Income ($I_i^M - I_i^R$)	+.018	+.035	-.002	-.052	-.023
Domination	Demand	Supply	Supply	Demand	Supply
United States					
Adjusted Employment ($E_i^M - E_i^R$)	+.009	-.045	+.001	-.004	-.002
Relative Income ($I_i^M - I_i^R$)	+.025	+.123	-.012	+.045	-.039
Domination	Demand	Supply	Supply	Supply	Demand

Unfortunately, the preceding analysis and data do not form a testable hypothesis. That is, there is no way for the data to prove the hypothesis wrong. Any set of data on incomes and employments, i.e., prices and quantities, may be arranged, as was done in this paper. The signs of the differences in employments and incomes must either coincide or be opposite, and thus "indicate" supply or demand domination. Nor may confidence intervals be placed on the numerical entries of table 12. For example, the difference between the relative income in Montana and Wyoming/Idaho in the laborers occupation is only +.001. There is no way to calculate the statistical probability that this value is actually negative. On the other hand, less confidence need not be placed on those estimates which are near zero. Certain, and not improbable, combinations of supply and demand elasticities would lead one to expect very small absolute differences in incomes and employments.[27]

If the aforementioned restrictions are kept in mind, and if the assumptions underlying the construction of the data are accepted, conclusions may be reached concerning the influences operating in the various labor markets. These inferences are particularly useful for policy-making because the relatively most important factor, supply or demand, is identified.

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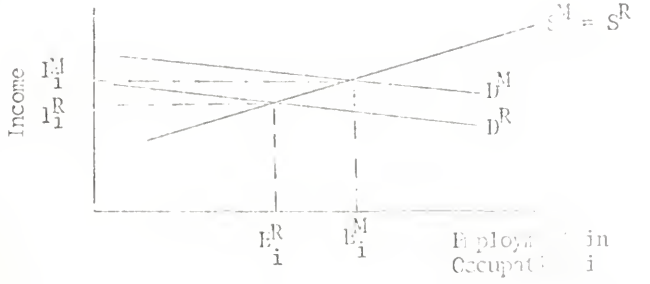
27. Assume that the demand and supply functions for an occupation are very elastic in both Montana and the comparison region. Then, even pronounced demand domination, pictured below, would result in small differences in income. Inelastic functions would lead to small differences in employment.



An illustration of a use of this analytic procedure by examining the conditions in one labor market follows.

Table 12 reveals that the professional, technical, and kindred occupation in Montana has lower incomes and proportion of total employment than those in any of the comparison regions. Thus, demand domination, Montana's demand curve is "to the left" of that of any of the comparison regions, is indicated in all cases.[28] This suggests that attempts to increase employment in this occupation by operating on the supply side of the market will be doomed to failure.[29] Suppose that, in order to increase the number of Montanans in this occupation, higher education is promoted. The increase in graduates would shift Montana's supply curve for this occupation outward, lower incomes, and finally result in many of them leaving the state. It is interesting to note that this prediction correlates with the often-heard statement that many graduates of Montana colleges would like to remain in the state but are unable to find well-paying jobs.

C. The Quality of the Data

The previous section presented a behavioral model which is capable of explaining the differences in standardized distributions of occupations. However, with the exception of the illustrative example using

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28. It must be remembered that this is relative. There is no way of determining the influence of supply. All that is known is that it is "less" than demand.

29. Demand domination does not imply that Montana's production functions are such that less of this occupation is used. As was stated earlier, the Census Bureau industries do not have identical products in each region. This situation was classified as variations in the production functions and will appear as an influence on the demand side of the market.

the professional, technical, and kindred occupation, the author has carefully avoided using it to make judgments concerning Montana. The reason for this reluctance is that many assumptions are needed to make the census data conform to the model. However, the methodology itself seems to offer a promising engine of analysis, if only confidence could be placed in the data. It is for this reason that the remainder of this section is devoted to a critique of the census data and suggestions for improvements in the way existing data is now collected.

1. Employment should be cross-classified by industry and occupation. The presently collected industry data is quite complete but does not conform to the choices actually made in the labor market. That is, people usually choose occupations, not industries, in which to work. The occupational definitions need not be detailed but should reflect obvious differences in skill, education, and responsibilities. The census definitions, while not ideal, provide a start. If standardized distributions are to be calculated, cross-classification is necessary.

2. Data for a number of years is necessary for reliable analysis. Economies continually react to past stimuli and are, simultaneously, creating situations which will cause change in the future. Data from a single period does not enable a researcher to distinguish between temporary and persistent phenomena. For example, the implied demand domination in the professional, technical, and kindred occupation may have been caused by an unusual situation in 1959 which showed up in the 1960 Census. In other words, the use of

data from only a single time period forces one to assume that observed values are in equilibrium. Repeated observations over time would enable the movement toward, or away from, equilibrium to be observed.

3. The use of annual averages would eliminate the bias imparted by seasonal employment. In this state, employment in certain industries, such as agriculture, construction, and the resort trade, displays large vacillations over the course of a year. The Census data for Montana, which were used in the previous section, represent only one point in time and industries which are in operation during that season will be over-represented relative to those which are not. In addition, the comparisons between Montana and the other regions will be biased if they have different patterns of seasonality. For example, the standardized distribution of occupations depends crucially on the extent of seasonal variations. To see this, assume that Montana's only industries are agriculture and recreation--and that employees are classified as either managers or laborers. Hypothetical Montana employment for one day, April 1, and the average for the year are presented in table 13. The relative national importance of the industries is, for simplicity, assumed to display no seasonal change. The standardized distribution of employment calculated from the annual averages classifies 60 percent of the employed as laborers. However, because of the seasonal nature of the recreation industry, the same procedure applied to the April 1 data results in only 56 percent in the laborer classification. Thus, an accurate picture can be obtained only when monthly, or at least quarterly observations, can be used to compute annual averages.

TABLE 13

Effect of Seasonal Fluctuations in Employment

Hypothetical Montana Employment, April 1

Industry	National Importance of Industry	Managers		Laborers	
		Employment	Percent of Industry	Employment	Percent of Industry
Agriculture	.75	100	50	100	50
Recreation	.25	100	25	300	75
Standardized Occupational Distribution (Percent of State Employment)		43.75%		56.25%	

Hypothetical Montana Employment, Annual Average

Industry	National Importance of Industry	Managers		Laborers	
		Employment	Percent of Industry	Employment	Percent of Industry
Agriculture	.75	100	33	200	66
Recreation	.25	100	33	200	66
Standardized Occupational Distribution (Percent of State Employment)		33 1/3%		66 2/3%	

4. Wages, rather than incomes, should be reported for each occupation. Firms and individuals, as suppliers and demanders of labor, make their decisions on the basis of the wage. Annual incomes are the result of these decisions. The additional wage data for all employed may be collected and published with a minimum of effort. The pay period, and thus the wage per labor unit, varies greatly between occupations, but is usually consistent within each classification. For example, the pay period for secretaries is different from that of brick layers, but usually coincides with that of clerks. Also, weekly and annual wages may be mechanically converted into monthly, or any other, equivalent. Thus, only a few wage categories, such as hourly and annual, need to be used. Naturally, wage data should be reported with the same frequency as employment.

5. A unit of labor, or the calculation of full-time equivalent employment, should be established and published along with actual employment. The demand and supply of labor determine equilibrium labor services, not employment. A shift in either function may result in a change in, say, hours worked rather than employment. Thus, strictly speaking, the appropriate data would be in terms of labor units rather than employment. However, it would probably be easier to adjust employment data for labor unit differences, or to construct full-time equivalent employment. Corrections may be made within each occupation so that differences in measuring labor units, e.g., hours, weeks, etc., cause little problem. The number of hours worked is the obvious choice for workers paid on this basis. For those hired on annual or monthly basis, all that need be reported is if employment is full-time, half-time, quarter-time, and so on. Even migrant workers, who are often paid at piece rate, may be classified as to the number of weeks they worked, say, four or more days. All measures of labor units are rough approximations.

But even such crude estimates allow for the correction of obvious differences and increases the confidence that apparent variations in employment reflect differences in labor services.[29]

What then, is the result of this discussion of employment data? If all the proposals were implemented, it would amount to nothing less than a complete reorganization and expansion of our information-gathering apparatus. Such a hope is, of course, unrealistic. But if such suggestions lead to future improvements in published data to make them more closely correspond to actual economic decisions, e.g., occupational rather than industrial employment, it would be considered a success. The tentative conclusions in this paper were reached using present data. Imagine their potential usefulness if the uncertainty could be reduced!

D. Summary

This section has examined the occupational distribution of Montana employment. This classification, because it roughly corresponds to the decision-making units operating in the labor markets, allowed many of the explanations to be stated in terms of supply and demand. For Montana, it was found that the occupational structure of employment varied greatly from

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29. An example may clarify the proposal. The following data refer to average weekly hours in manufacturing in the United States and Montana.

Average Weekly Hours, 1967

United States	Montana
40.6	39.6

Manufacturing employment in the two regions would be weighted by the number of hours worked. Or, one unit of employment in Montana is equivalent to $\frac{39.6}{40.6} = .975$ units of United States employment.

industry to industry. This is to be expected because each industry produces a different product and would require labor with different qualifications. If one can assume that Montana is a homogeneous labor market, the difference in the occupation mix between industries may be assigned to differences in demand. Large variations were noted between the occupational distribution of employment in each Montana industry and its counterpart in the comparison regions. No one cause of the divergence was singled out for special consideration. The aggregate distribution of occupational employment in Montana was found to be significantly different from that of the comparison regions. Correction for differences in the industrial structure reduced, but did not eliminate, the variations. Finally, a theoretical model was devised which identifies either demand or supply as the most important influence causing labor market differences. However, because of the known unreliability of the data, policy implications were not derived and the examples given are only intended to be illustrative.

III

CONCLUDING REMARKS

The purpose of this paper is twofold: (1) to be a detailed source of information to others, and (2) to point out and analyze some of the obvious problems uncovered. In order to fulfill the first goal, all information was presented in its most detailed form. For example, in the discussion of industry employment, none of the 45 census industries were eliminated from table 1. This amount of detail, while it presents the complete picture, means

that any conclusions must be very generalized. Therefore, this section will only cover the major points of the previous sections.

Two very different procedures were used in analyzing the industrial and occupational distributions of employment in Montana. The first dealt with describing and identifying the differences between Montana and the three regions chosen for comparison. The second procedure was much more speculative in nature and attempted to provide reasons for the differences discovered.

Examination of employment by industry provides a measure of the important products of the state in terms of employment. As would be expected, Montana has more than its share of employment in agriculture, transportation, and the extractive industries. These comprise what has been called our "Economic Base." The fact that all of them are concerned with the exploitation of our natural resources leaves one with the impression that Montana has been unable to attract diversified industries. We also have more than our share of employment in certain service and governmental industries. The reason for this concentration may be due, in part, to our tourist attractions and the geographic and demographic features of the state.

Montana's occupational distribution of employment is significantly different from those of the comparison regions. Our industry mix is responsible for a relative overabundance of certain occupations such as the self-employed and laborers. But over and above this, the traditional tools of supply and demand were used to suggest additional reasons for Montana's unique distribution of occupational employment.

In conclusion, it should be reiterated that the purpose of this paper was not to propose policy. The data used are over 10 years old and policies for the seventies should not be based on 1960 information. Even if the 1970 Census were available, this type of information contains so many sources of potential bias--such as seasonality--that it must be used with reservation. However, many of the characteristics of Montana found in the 1960 data represent underlying features of the state and will probably continue into the future.